

**ABSTRACT**

The system for analyzing multiple samples includes a plurality of portable sample supports each for accommodating a plurality of samples thereon, and an identification mechanism for identifying each sample location on each of the plurality of sample supports. The mass spectrometer is provided for analyzing each of the plurality of samples when positioned within a sample receiving chamber, and a laser source strikes each sample with a laser pulse to desorb and ionize sample molecules. The support transport mechanism provides → [provided] for automatically inputting and outputting each of the sample supports from the sample receiving chamber of the mass spectrometer. A vacuum lock chamber receives the sample supports and maintains at least one of the sample supports within a controlled environment while samples on another of the plurality of sample supports are being struck with laser pulses. The computer is provided for recording test data from the mass spectrometer and for controlling the operation of the system.